



FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 2, 15, 25, 27 and 101

[WT Docket No. 20-443, GN Docket No. 17-183, RM-11768 (Proceeding Terminated); FCC 21-13; FRS 17479]

Expanding Flexible Use of the 12.2-12.7 GHz Band

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Commission seeks comment on whether it could add a new Mobile allocation or expanded terrestrial service rights in 500 megahertz of mid-band spectrum between 12.2-12.7 GHz (12 GHz band) without causing harmful interference to incumbent licensees. Assuming the Commission could do so, it seeks comment on whether that action would promote or hinder the delivery of next-generation services in the 12 GHz band given the existing and emergent services offered by incumbent licensees. The Commission proceeds mindful of the significant investments made by incumbents and values the public interest benefits that could flow from investments made to provide satellite broadband services, particularly in rural and other underserved communities that might be more expensive to serve through other technologies. The Commission believes that it is appropriate, however, to initiate a rulemaking proceeding to allow interested parties to address whether additional operations can be accommodated in the band while protecting incumbent operations from harmful interference and for the Commission to assess the public interest considerations associated with adding a new allocation.

DATES: Comments due on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and reply comments due on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: You may submit comments, identified by WT Docket No. 20-443 and GN

Docket No. 17-183, by any of the following methods:

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <https://www.fcc.gov/ecfs>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by commercial overnight courier, or by first-class or overnight U.S.

Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street, NE, Washington DC 20554
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19.
- During the time the Commission's building is closed to the general public and until further notice, if more than one docket or rulemaking number appears in the caption of a proceeding, paper filers need not submit two additional copies for each additional docket or rulemaking number; an original and one copy are sufficient.

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Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

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SUPPLEMENTAL INFORMATION: This is a summary of the Commission's Notice of Proposed Rulemaking (*NPRM*), in WT Docket No. 20–443; FCC 21–13, adopted on January 2, 2021 and released on January 15, 2021. The full text of this document is available electronically via the FCC's website at <https://docs.fcc.gov/public/attachments/FCC-21-13A1.pdf> or via the FCC's Electronic Comment Filing System (ECFS) website at <http://www.fcc.gov/ecfs>.

(Documents will be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.)

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Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980, as amended (RFA), requires that a regulatory flexibility analysis be prepared for notice and comment rulemaking proceedings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” Accordingly, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning potential rule and policy changes contained in this *NPRM*. The IRFA is set forth in Appendix A, visit <https://www.fcc.gov/edocs>.

Paperwork Reduction Act

This *NPRM* may contain potential new or revised information collection requirements. Therefore, the Commission seeks comment on potential new or revised information collections subject to the Paperwork Reduction Act of 1995. If the Commission adopts any new or revised information collection requirements, the Commission will publish a notice in the *Federal*

Register inviting the general public and the Office of Management and Budget to comment on the information collection requirements, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), the Commission seeks specific comment on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

Ex Parte Rules

Pursuant to § 1.1200(a) of the Commission's rules, this *NPRM* shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in

this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Synopsis

I. BACKGROUND

1. In the United States, the 12 GHz band is allocated on a primary basis for non-Federal use for Broadcasting Satellite Service (BSS) (referred to domestically in the band as Direct Broadcast Satellite (DBS), Fixed Satellite Service (space-to-Earth) limited to non-geostationary orbit systems (NGSO FSS), and Fixed Service.¹ While these three services are co-primary, NGSO FSS and Fixed Service are allocated on a non-harmful interference basis with respect to BSS.²

2. NGSO FSS operators also have a non-federal co-primary downlink allocation and access to the 10.7-12.2 GHz band on a co-primary basis with Fixed Service in 10.7-11.7 GHz and on a primary basis from 11.7-12.2 GHz.³ Meanwhile, the adjacent frequencies above the band, 12.7-12.75 GHz, are allocated for non-federal Fixed Service, FSS, and Mobile Service.

¹ See 47 CFR 2.106, United States Table of Frequency Allocations, non-Federal Table for the band 12.2-12.7 GHz. NGSO FSS (space-to-Earth) operations are authorized pursuant to international footnote 5.487A, which provides additional allocations including in Region 2 as follows:

[The 12.2-12.7 GHz is] allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of [ITU Radio Regulations] No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the [ITU Radiocommunication] Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and [international footnote] No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the [12 GHz band] shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated.

47 CFR 2.106, n.5.487A. When an international footnote is applicable without modification to non-Federal operations, the Commission places the footnote on the non-Federal Table. See 47 CFR 2.105(d)(5).

² See 47 CFR 2.106, n.5.490 (International Footnote). In Region 2, in the 12.2-12.7 GHz band, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the broadcasting satellite Plan for Region 2 contained in Appendix 30. "Harmful Interference" is defined under the Commission's rules as "[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with the ITU Radio Regulations." 47 CFR 2.1(c).

³ See 47 CFR 2.106. See also *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (*2017 NGSO Order*). FSS is co-primary with Fixed Service for individually licensed earth stations. Individually licensed FSS earth stations require coordination with co-primary Fixed Service. The *2017 NGSO Order* also adopted rules to allow blanket earth station licensing for NGSOs in the 10.7–11.7 GHz band on an unprotected basis relative to terrestrial Fixed Service. As a result, blanket earth station licenses for NGSOs cannot claim interference protection from terrestrial Fixed Service in the band. *Id.* at 7817, paras. 24-25.

3. Currently there are three services authorized and operating in the band: DBS providers operating under the primary BSS allocation, Multi-Channel Video and Data Distribution Service (MVDDS) licensees operating on a non-harmful interference basis to DBS under the co-primary Fixed Service allocation, and NGSO licensees operating on a non-harmful interference basis to DBS under the co-primary NGSO FSS allocation. The Commission's rules enable sharing between co-primary NGSO FSS and MVDDS using a combination of technical limitations, information sharing, and first-in-time procedures.⁴

4. The Commission added the DBS allocation in the early 1980s⁵ and DBS service began in 1994.⁶ In 1996 and 2004, some of these licenses were awarded by competitive bidding.⁷ In 2000, the Commission permitted a new terrestrial service, MVDDS, to operate in the 12 GHz band under the existing Fixed Service allocation on a co-primary, non-harmful interference basis to the incumbent DBS providers, and on a co-primary basis to NGSO FSS.⁸ The Commission also adopted rules to permit NGSO FSS operations in the 12 GHz band at this

⁴ See 47 CFR 101.113(a) n.11, 101.147(p).

⁵ See *Inquiry into the Development of Regulatory Policy in Regard to Direct Broadcast Satellites for the Period Following the 1983 Regional Administrative Radio Conference*, Report and Order, 90 FCC2d 676 (1982), recon. denied, 53 RR2d 1637 (1983).

⁶ See *Revision of Rules and Policies for the Direct Broadcast Satellite Service*, Report and Order, 11 FCC 9712 (1995). DBS operations are subject to the International Telecommunication (ITU) Radio Regulations BSS and Feeder Link Plans contained in Appendices 30 and 30A.

⁷ In 1996 the Commission held two auctions for DBS orbital slots at 110° and 148° in 1996. See, e.g., <https://www.fcc.gov/auction/8>; <https://www.fcc.gov/auction/9>. In 2004, the Commission held an auction for three licenses for certain channels at DBS orbital slots at 175°, 166° and 157° but this auction was nullified. See *Direct Broadcast Satellite (DBS) Service Auction Nullified: Commission Sets Forth Refund Procedures for Auction No. 52 Winning Bidders and Adopts a Freeze on All New DBS Service Applications*, Public Notice, 20 FCC Rcd 20618, 20618 & n.3 (2005) (citing *Northpoint Technology, Ltd. v. FCC*, 412 F.3d 145 (D.C. Cir. 2005)). In its decision, the Appellate Court vacated and remanded the section of the DBS Auction Order that concluded that DBS is not subject to the auction prohibition of the Open-Market Reorganization for the Betterment of International Telecommunications Act, Pub. L. No. 106-180, 114 Stat. 48 section 647 (enacted Mar. 12, 2000), codified at 47 U.S.C. 765f (ORBIT Act). *Id.* at n.3

⁸ See *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range, Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates; and Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide A Fixed Service in the 12.2-12.7 GHz Band*, ET Docket No. 98-206, First Report and Order and Further Notice of Proposed Rule Making, 16 FCC Rcd 4096, 4177, para. 213 (2000) (*First R&O and FNPRM*).

same time.⁹

5. The service rules for MVDDS permit one-way digital fixed non-broadcast service, including one-way direct-to-home/office wireless service.¹⁰ To protect DBS, the Commission adopted technical rules to ensure that MVDDS stations would not cause harmful interference to DBS and imposed extensive coordination requirements on MVDDS licensees for each proposed station.¹¹ These rules include detailed frequency coordination procedures, interference protection criteria, and limitations on signal emissions, transmitter power levels, and transmitter locations.¹² In particular, the rules limit the effective isotropic radiated power (EIRP) for MVDDS stations to 14.0 dBm per 24 megahertz (−16.0 dBW per 24 megahertz).¹³

6. To accommodate co-primary DBS earth stations that must be protected from interference caused by MVDDS, an MVDDS licensee may not begin operation unless it can ensure that the equivalent power flux density (EPFD)¹⁴ from a proposed transmitting antenna does not exceed the applicable EPFD limit at any DBS subscriber location.¹⁵ Specifically, an MVDDS licensee cannot begin operation in the 12 GHz band unless it can ensure that the signal

⁹ *Id.* at 4099-4100, para. 2; *see also Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-band*, IB Docket No. 01-96, Report and Order, 17 FCC Rcd 7841 (2002).

¹⁰ *See* 47 CFR 101.1407 (two-way services can be provided using spectrum in other bands for the return link). *See also Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, Memorandum Opinion and Order and Second Report and Order, 17 FCC Rcd 9614 (2002) (*MVDDS Second Report and Order*) (*aff'd Northpoint Technology, LTD et al. v. FCC*, 414 F.3d 61 (D.C. Cir. 2005)).

¹¹ *See* 47 CFR 101.1440.

¹² *See, e.g., MVDDS Second Report & Order*, 17 FCC Rcd at 9634-9664 paras. 53-125; 9690-9695 paras. 196-209; 47 CFR 25.139 (NGSO FSS coordination and information sharing between MVDDS licensees in the 12.2 GHz to 12.7 GHz band); 25.208(k) (Power flux density limits); 101.103 (Frequency coordination procedures); 101.105 (Interference protection criteria); 101.111 (Emission limitations); 101.113 (Transmitter power limitations); 101.129 (Transmitter location); 101.1409 (Treatment of incumbent licensees); 101.1440 (MVDDS protection of DBS).

¹³ *See* 47 CFR 101.113(a) n.11; 101.147(p). The EIRP limit for MVDDS is expressed as a power spectral density, *i.e.*, 14 dBm *per 24 megahertz of spectrum*. Herein the Commission occasionally refers to EIRP levels in shorthand, *e.g.*, “14 dBm.” The Commission clarifies that these shorthand references are for convenience only.

¹⁴ The EPFD is the power flux density produced at a DBS receive earth station, taking into account shielding effects and the off-axis discrimination of the receiving antenna assumed to be pointing at the appropriate DBS satellite(s) from the transmitting antenna of a MVDDS transmit station. 47 CFR 101.105(a)(4)(ii)(A).

¹⁵ The Commission established different EPFD limits in four regions of the U.S., *see* 47 CFR 101.105(a)(4)(ii)(B), mainly due to differences in rainfall in each region. *See, e.g., MVDDS Second Report & Order*, 17 FCC Rcd at 9691, para. 197.

from its proposed transmitting antenna will not exceed certain specified EPFD limits at the receive antennas of any DBS customers of record (i.e., those who have had their antenna installed either before or within 30 days after the MVDDS licensee provides 90-days notice to DBS licensees of its intent to commence operations).¹⁶ Accordingly, when an MVDDS licensee is proposing to deploy a transmitting antenna, it must conduct a survey of the area around its proposed transmitting antenna site to determine the location of all DBS customers of record that may potentially be affected by its service.¹⁷ After coordinating a proposed transmitter with DBS licensees, the MVDDS licensee must remediate all complaints of interference to DBS customers of record for one year after it begins operating the transmitter.¹⁸ Going forward, the burden shifts to DBS licensees for new customers (and after one year for the customers of record) to take into account the presence of the MVDDS operations and ensure that DBS subscribers do not suffer interference from previously coordinated MVDDS stations.¹⁹ The Commission found that these and the other technical requirements would ensure that any interference caused to DBS customers will not exceed a level that is considered permissible.²⁰

7. The Commission also enabled sharing between co-primary NGSO FSS and MVDDS using a combination of technical limitations, information sharing, and first-in-time procedures.²¹ Specifically, these two services gain priority based on a first-in-time, first-in-right approach, under which NGSO FSS receivers and MVDDS transmitting systems are afforded priority in the 12 GHz band portion of spectrum *vis-à-vis* each other based on which deployed earlier.²²

¹⁶ See 47 CFR 101.1440(a).

¹⁷ See 47 CFR 101.1440(b).

¹⁸ See 47 CFR 101.1440(g).

¹⁹ See 47 CFR 101.1440(e) & (g).

²⁰ See, e.g., *MVDDS Second Report & Order*, 17 FCC Rcd at 9640-9663 paras. 67-125, 9691-92, 198; see also 47 CFR 2.1 (defining harmful interference).

²¹ See 47 CFR 101.113(a) n.11; 101.147(p).

²² See 47 CFR 101.103(f)(1); see also 47 CFR 101.105(a)(4)(i) (limiting the PFD level beyond 3 km from an MVDDS station to -135 dBW/m² in any 4 kHz measured and/or calculated at the surface of the earth), 101.129(b)

8. Most recently, in 2016 and 2017, proponents of a new generation of NGSO FSS systems sought Commission authority for planned constellations of hundreds or thousands of small satellites using several frequency bands, including the 12 GHz band, and in 2017, the Commission updated its rules to enable the deployment of these emerging systems.²³

9. Two U.S.-licensed DBS providers, DISH Network L.L.C. (DISH) and DIRECTV²⁴ use the band throughout the US to provide DBS directly from geostationary-orbit (GSO) satellites to relatively small dish antennas at tens of millions of individual homes and businesses. DIRECTV and DISH Network had over 22 million combined subscribers as of the third quarter of 2020.²⁵ Meanwhile, eight companies (10 legal entities) currently hold 191 of 214 MVDDS licenses.²⁶

10. In April 2016, the MVDDS 5G Coalition, which included eleven of the twelve MVDDS licensees at that time, filed a Petition for Rulemaking requesting reforms to the rules for the 12 GHz band.²⁷ The Petition seeks commencement of a rulemaking proceeding to: (i) add a Mobile allocation at 12.2-12.7 GHz to the Non-Federal Table of Frequency Allocations,

(prohibiting location of MVDDS transmitting antennas within 10 km of any qualifying NGSO FSS receiver absent mutual agreement of the licensees).

²³ See *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (*recon. pending*).

²⁴ DIRECTV became a subsidiary of AT&T in July 2015. See, e.g., *Applications of AT&T, Inc. and DIRECTV for Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 14-90, Memorandum Opinion and Order, 30 FCC Rcd 9131 (2015). Herein the Commission refers to AT&T and DIRECTV interchangeably.

²⁵ See S&P Market Intelligence, *Multichannel Operators by DMA* (Q3 2020).

²⁶ The remaining 23 licenses automatically terminated for failure to meet the buildout requirement. See *Requests of Three Licensees of 22 Licenses in the Multichannel Video and Data Distribution Service for Extension of Time to Meet the Final Buildout Requirement for Providing Substantial Service under § 101.1413 of the Commission's Rules, Applications of Three Licensees for Renewal of 22 Licenses in the Multichannel Video and Data Distribution Service*, Order, 33 FCC Rcd 10757 (WTB BD Oct. 29, 2018). See also Blumenthal DTV LLC, Call Sign WQAR709 (Terminated July 26, 2014).

²⁷ *Petition of MVDDS 5G Coalition Petition for Rulemaking*, RM-11768, filed Apr. 26, 2016 (MVDDS 5G Coalition Petition). See also *Petition for Rulemakings Filed*, Public Notice, Report No. 3042 (May 9, 2016) (Petition Public Notice). In its most recent filing, the Coalition's members were reported to be: Cass Cable TV, Inc. (Cass Cable), DISH Network L.L.C., Go Long Wireless, LTD. (Go Long Wireless), MDS Operations, Inc., MVD Number 53 Partners, Satellite Receivers, Ltd., SOUTH.COM LLC, Story Communications, LLC, and Vision Broadband, LLC (Vision Broadband). See Letter from Chad Winters, Cass Cable, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 1 (filed May. 28, 2019) (MVDDS 5G Coalition May 28, 2019 *Ex Parte*). The Commission notes that MDS Operations subsequently assigned its remaining 60 MVDDS licenses to RS Access.

(ii) delete or demote to secondary the “unused” NGSO FSS allocation in this band from the Non-Federal Table of Frequency Allocations, (iii) allow MVDDS licensees to provide two-way, point-to-point or mobile broadband service, (iv) eliminate the MVDDS effective isotropic radiated power (EIRP) limit, and (v) seek comment on easing the four regional equivalent power flux density (EPFD) limits.

11. The Coalition contended that the (then) 15-year-old MVDDS rules did not account for the “urgent national priority” to make additional spectrum available for 5G mobile services or the intervening technological developments that would now make it feasible to provide two-way mobile broadband services in the band while simultaneously protecting DBS from harmful interference.²⁸ The Coalition stated that “5G services have unique attributes that facilitate sharing in high frequency bands, such as the MVDDS band, since they can be used in a localized way to provide capacity relief in urban canyons and indoors.”²⁹ In conjunction with its Petition, the Coalition provided two Coexistence Studies that it claimed illustrate that the new rules it was proposing would protect DBS operators in the band but that they would be incompatible with NGSO FSS.³⁰

12. In the intervening four years, the Commission has taken action to make additional spectrum available for 5G services.³¹ In 2020, the Commission initiated a proceeding to consider

²⁸ See MVDDS 5G Coalition Petition at 17-18; MVDDS 5G Coalition Reply at 3.

²⁹ MVDDS 5G Coalition Reply at 3. The Coalition notes that, “with the emergence of 5G, higher spectrum bands can be used to provide much needed broadband capacity relief using targeted, small cell deployments (such as in buildings and at urban street level locations) that present a lower interference potential than traditional wide-area macrocell deployments in lower frequency bands. Additionally, advanced antenna techniques like “beamforming” and “beamsteering” allow better control of transmitter energy, enabling transmissions to be more narrowly focused to desired locations (and away from receivers with which they might interfere) dynamically.” MVDDS 5G Coalition Petition at 18.

³⁰ MVDDDS 5G Coalition Comments, Attach. 1, MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence (Coexistence 1) and MVDDS 5G Coalition Reply, Appx. A, MVDDS 12.2-12.7 GHz Co-Primary Service Coexistence II (Coexistence 2) (collectively, Coexistence Studies).

³¹ Since the Petition was filed in 2016, the Commission has taken action in several proceedings to make more than six gigahertz of spectrum available for 5G service, including 4,950 megahertz of high-band spectrum, over 500 megahertz of mid-band spectrum, and several swaths of low-band spectrum. *See e.g., Modernizing and Expanding Access to the 70/80/90 GHz Bands, et al*, Notice of Proposed Rulemaking and Order, 35 FCC Rcd 6039 (2020); *Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Report and Order, 35 FCC Rcd 3852 (2020); *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, Report and Order, 35 FCC Rcd 5183 (2020); *Improving Public Safety Communications in the 800 MHz*

rule changes to allow the provision of 5G backhaul and broadband to ships and aircraft in motion in the 70/80/90 GHz bands. Additionally in 2020, the Commission took action to make available 280 megahertz of 3.7-4.2 GHz band spectrum while relocating existing satellite operations to the upper part of the band. Also in 2020 the Commission modernized certain rules governing the 800 MHz and took action to expand unlicensed broadband opportunities in the 6 GHz band. In 2019 the Commission completed Auction 101, licensing 850 megahertz of spectrum for flexible use in the 28 GHz band. In Auction 102, the Commission licensed 700 megahertz of spectrum for flexible use in the 24 GHz band. In Auction 103 the Commission licensed 3,400 megahertz of spectrum for flexible use in the upper 37 GHz band, the 39 GHz band, and the 47 GHz band. Also in 2019, the Commission proposed to reconfigure the 900 MHz band to facilitate the development of broadband technologies and services.³² The Commission has also taken steps to provide new opportunities for innovators and experimenters between 95 GHz and 3 THz.³³ In 2018, the Commission proposed providing greater flexibility to current EBS licensees and new opportunities to obtain unused spectrum in the 2.5 GHz band³⁴ and changed the rules governing Priority Access Licenses (PALs) to spur 5G investment and deployment in the 3.5 GHz band. In 2017, the Commission completed Auction 1002, licensing 70 megahertz of spectrum for flexible use in the 600 MHz band.

13. The MVDDS 5G Coalition Petition also preceded a 2016 processing round to

Band, Report and Order, 35 FCC Rcd 4935 (2020); Incentive Auction of Upper Microwave Flexible Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz Bands for Next-Generation Wireless Services Closes; Winning Bidders Announced for Auction 103, Public Notice, 35 FCC Rcd 2015 (2020); Winning Bidders Announced for Auction of 28 GHz Upper Microwave Flexible Use Service Licenses (Auction 101), Public Notice, 34 FCC Rcd 4279 (2019); Auction of 24 GHz Upper Microwave Flexible Use Service Licenses Closes; Winning Bidders Announced for Auction 102, Public Notice, 34 FCC Rcd 4296 (2019); Transforming the 2.5 GHz Band, Notice of Proposed Rulemaking, 33 FCC Rcd 4687 (2018); Promoting Investment in the 3550-3700 MHz Band, Report and Order, 33 FCC Rcd 10598 (2018); Expanding Flexible Use of the 3.7 to 4.2 GHz Band, Order and Notice of Proposed Rulemaking, 33 FCC Rcd 6915 (2018); Incentive Auction Task Force and Wireless Telecommunications Bureau Grant 600 MHz Licenses, Public Notice, 33 FCC Rcd 869 (2018). See also Federal Communications Commission, The FCC's 5G FAST Plan, <https://www.fcc.gov/5G> (last visited Jan. 7, 2021).

³² *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band, Report and Order, 35 FCC Rcd 5183 (2020).*

³³ *FCC Opens Spectrum Horizons for New Services & Technologies, Report and Order, 34 FCC Rcd 1605 (2019).*

³⁴ *Transforming the 2.5 GHz Band, Notice of Proposed Rulemaking, 33 FCC Rcd 4687 (2018).*

accept NGSO FSS applications and petitions for market access in several frequency bands and the Commission's reforms to its NGSO FSS rules.³⁵ In 2017, the Commission granted the first of the new generation requests—a petition for market access by WorldVu Satellites Limited (OneWeb) for a planned Low Earth Orbit (LEO) NGSO satellite system of 720 satellites authorized by the United Kingdom in the 10.7-12.7 GHz Band (in addition to several other bands).³⁶ The Commission concluded that “the pendency of the MVDDS 5G Coalition’s Petition for Rulemaking was not a sufficient reason to delay or deny these requests to use the band under the existing NGSO FSS allocation and service rules.”³⁷ In granting this request, however, the Commission conditioned access to the 12 GHz band on the outcome of the MVDDS 5G Coalition’s Petition and any other rulemaking initiated on the Commission’s own motion.³⁸ The Commission also agreed with comments of the MVDDS 5G Coalition that MVDDS should not have to protect any non-fixed NGSO-FSS operations in the band, if authorized in the future, because such operations had not been contemplated under the longstanding first-in-time MVDDS/NGSO FSS sharing approach.³⁹

14. The Commission subsequently granted five additional NGSO FSS requests to use bands that include 12 GHz band (among others).⁴⁰ Each grant is subject to modification to bring

³⁵ See *Satellite Policy Branch Information; OneWeb Petition Accepted for Filing (IBFS File No. SAT-LOI-20160428-00041), Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 10.7-12.7 GHz, 14.0-14.5 GHz, 17.8-18.6 GHz, 18.8-19.3 GHz, 27.5-28.35 GHz, 28.35-29.1 GHz, and 29.5-30.0 GHz Bands*, Public Notice, 31 FCC Rcd 7666 (IB July 15, 2016).

³⁶ See *WorldVu Satellites Limited, Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System*, Order and Declaratory Ruling, 32 FCC Rcd 5366 (2017) (*OneWeb Order*).

³⁷ *Id.* at 5369 para. 6.

³⁸ *Id.* at 5378, para. 26 (“This grant of U.S. market access and any earth station licenses granted in the future are subject to modification to bring them into conformance with any rules or policies adopted by the Commission in the future.”). See also *id.* at 5369, para. 6 (“Accordingly, any investment made toward operations in this band by OneWeb in the United States assume the risk that operations may be subject to additional conditions or requirements as a result of such Commission actions.”).

³⁹ *Id.* at 5370 para. 8.

⁴⁰ *Space Norway AS, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the Arctic Satellite Broadband Mission*, Order and Declaratory Ruling, 32 FCC Rcd 9649 (2018) (*Space Norway Order*); *Karousel Satellite LLC, Application for Authority to Launch and Operate a Non-Geostationary Earth Orbit Satellite System in the Fixed Satellite Service*, Memorandum Opinion, Order and Authorization, 33 FCC Rcd 8485 (2018) (*Karousel Order*), *Space Exploration Holdings, LLC Application For Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System*, Memorandum Opinion Order and Authorization, 33 FCC Rcd

it into conformance with any rules or policies adopted by the Commission in the future; the market-access grants to Space Norway, Kepler, and Theia also state that this condition includes any earth station licenses granted in the future. In all but the *Space Norway Order*, the Commission expressly stated that the any investments made toward operations in the bands authorized in the United States assume the risk that operations may be subject to additional conditions or requirements as a result of any future Commission actions, and all of the orders directly or indirectly referenced the MVDDS 5G Coalition Petition.⁴¹ Parties disagree about the scope and applicability of these conditions.⁴²

15. Since the Commission granted these requests, OneWeb, Kepler Communications (Kepler) and SpaceX have launched the first satellites of their authorized constellations and additional launches are scheduled in 2021. To date, OneWeb has launched 110 satellites and Kepler has launched 2 satellites. SpaceX has deployed more than 900 satellites that use the 12 GHz band among other bands, which now makes it the largest satellite constellation in the world.⁴³ In addition, through the Commission’s Rural Digital Opportunity Fund reverse auction, SpaceX received \$88.5 million in annual support for ten years (or \$885 million total) to provide

3391 (2018) (*SpaceX Order*), *Kepler Communications Inc. Petition for Declaratory Ruling to Grant Access to the U.S. Market for Kepler’s NGSO FSS System*, Order, 33 FCC Rcd 11453, (2018) (*Kepler Order*), *Theia Holdings A, Inc. Request for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service, Mobile-Satellite Service, and Earth-Exploration Satellite Service*, Memorandum, Opinion and Authorization, 34 FCC Rcd 3526 (2019) (*Theia Order*).

⁴¹ See *Space Norway Order*, 32 FCC Rcd at 9655, 9611, paras. 13, 27 (2017); *Karousel Order*, 33 FCC Rcd at 8486-87, paras. 3, n.14, 25(v) (2018); *SpaceX Order*, 33 FCC Rcd at 3399, 3401-02, 3407, paras. 19, 26, 40(r) (2018); *Kepler Order*, 33 FCC Rcd at 11455, 11462-63, paras. 4-5, 29 (2018), *Theia Order*, 34 FCC Rcd at 3539-40, 3548, paras. 36, 58 (2019).

⁴² Space Exploration Technologies Corp. (SpaceX) argues that its authorizations are not conditional in 12 GHz band. See, e.g., Letter from David Goldman, Director of Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 2 (filed Nov. 5, 2020) (SpaceX Nov. 5, 2020 *Ex Parte*). DISH argues that “every . . . Ku-band authorization is conditioned on the outcome of the 12 GHz petition.” Letter from Jeffrey H. Blum, Executive Vice President, External and Legislative Affairs, DISH, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 2 (filed Nov. 12, 2020) (DISH Nov. 12, 2020 *Ex Parte*); see also *id.* at 1-2 citing *SpaceX Order*, 33 FCC Rcd 3391, n.88.

⁴³ In a March 2020 NGSO FSS processing round, these four companies filed additional applications to use the 12 GHz band. See SpaceX, SAT-LOA-20200526-00055; OneWeb, SAT-MPL-20200526-00062; New Spectrum Satellite, SAT-LOA-20200526-00060; Kepler, SAT-PDR-20200526-00059. These companies have also filed several applications for earth stations. See, e.g., SpaceX Application File No. SES-LIC-20190211-00151; SpaceX File Nos. SES-LIC-20190402-00425, SES-LIC-20190402-00426, SES-LIC-20190402-00427, SES-LIC-20190402-00450, SES-LIC-20190402-00451, SES-LIC-20190405-00453; OneWeb Application File No. SES-LIC-20190930-01217; OneWeb Application File No. SES-LIC-20190930-01237.

broadband service to 642,925 locations.⁴⁴ SpaceX claims that its service is capable of providing downlink/uplink speeds of 103/42 megabits-per-second and a consistently observed median latency of 30 milliseconds.

16. In its most recent filing, the MVDDS 5G Coalition continues to ask the Commission to consider modernizing MVDDS rules and to protect MVDDS interests in the band. While the MVDDS 5G Coalition originally contended that 5G terrestrial use and NGSO FSS use are incompatible, other proponents of flexible use (such as two-way mobile)—including some of the members of the MVDDS 5G Coalition—recently have suggested the possibility of sharing in the band.⁴⁵ Meanwhile, OneWeb, AT&T Services, Inc. (AT&T), SpaceX, Intelsat License LLC (Intelsat), SES S.A. (SES), Kepler, and others contend that sharing remains impossible between NGSO FSS and terrestrial two-way mobile operations.

II. DISCUSSION

17. The Commission has long been committed to ensuring that spectrum is put to its highest and best use. As such, the Commission commence this rulemaking proceeding to consider whether the current rules for the use of 12 GHz best serve the public interest. As a threshold matter, therefore, the Commission seeks comment on how to weigh the spectrum the Commission has already made available for 5G over the past four years and the hundreds of satellites that have been launched by the NGSO FSS operators in considering whether it is technically feasible to add additional or expanded spectrum rights in the 12 GHz band without causing harmful interference to incumbent licensees (and, if so, whether a balancing of public interest benefits would support taking that step). In the sections below, the Commission seeks

⁴⁴ *Rural Digital Opportunity Fund Phase I Auction (Auction 904) Closes: Winning Bidders Announced*, Public Notice, 35 FCC Rcd 13888, Appx. A. (2020).

⁴⁵ See e.g., Letter from Martha Suarez, President, Dynamic Spectrum Alliance (DSA), to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 2 (filed Aug. 21, 2020) (DSA Aug. 21, 2020 *Ex Parte*); Letter from Trey Hanbury, Counsel, RS Access, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 2-3 (filed Sept. 21, 2020) (RS Access Sept. 21, 2020 *Ex Parte*); DISH Nov. 12, 2020 *Ex Parte* at 4 (stating that “since the 2016 studies, developments in the satellite industry indicate that NGSO FSS constellations possess geostationary-like functions and properties that could prove more compatible with 5G services in the 12 GHz Band than the last-generation NGSO earth stations.”).

comment on two potential approaches to future use of the 12 GHz band: increasing terrestrial use of the shared band or continuing with the current framework. The Commission seeks comment on each approach, including the costs and benefits, in order to pursue the Commission's goals of putting spectrum to its highest-value and most efficient use while protecting incumbent operations in the band from harmful interference.

A. Enhanced Opportunities for Shared Use of the Band

18. First, the Commission seeks comment on whether it can increase opportunities for shared use of the band while protecting incumbents from harmful interference. The MVDDS 5G Coalition argues that technological advances since the creation of MVDDS in 2000 justify revisiting the rules for terrestrial use of the band. Specifically, the MVDDS 5G Coalition asserts that terrestrial flexible use service is compatible with DBS service due to technological advances, such as targeted small-cell deployments and advanced antenna techniques like beamforming and beamsteering, which allow better control of transmitter energy and therefore can protect DBS. Other proponents of terrestrial, flexible use of the band similarly argue that developments since the MVDDS Petition was submitted in 2016 open up the possibility of coexistence between DBS, terrestrial flexible use, and NGSO FSS operations, and they maintain that the complex technical issues this raises warrant a new Commission rulemaking. As such, the Commission seeks comment on adding a mobile service allocation throughout the 12 GHz band, whether coexistence between and among these competing services is technically achievable and, if so, what mechanisms the Commission might consider in facilitating such coexistence.

19. The Commission notes that section 303(y) provides the Commission with authority to provide for flexible use operations only if: “(1) such use is consistent with international agreements to which the United States is a party; and (2) the Commission finds, after notice and opportunity for public comment, that (A) such an allocation would be in the public interest; (B) such use would not deter investment in communications services and systems, or technology development; and (C) such use would not result in harmful interference

among users.”⁴⁶ The Commission seeks comment on whether adding a mobile allocation to the 12 GHz band to allow flexible, terrestrial use is consistent with this provision.⁴⁷ In particular, the Commission seeks information on the status of technologies that have been developed or are currently in development that would allow for two-way mobile communications in the 12 GHz band, whether standards have been set related to such technologies, whether there are any international agreements on a band plan or air interface for the 12 GHz band, and the impact (if any) on international rights for U.S.-licensed systems that might be affected as a result of its providing for expanded shared use of the band.⁴⁸

1. Protecting Satellite Incumbents from Harmful Interference

20. The Commission seeks comment on the technical parameters that could allow additional terrestrial use of the band without causing harmful interference to incumbent operators. Among other things, the Commission seeks comment on whether it should allow two-way communications and flexible use of the band as well as what technical parameters would be appropriate for such new terrestrial operations. For example, assuming existing MVDDS service rules as the baseline, should the Commission eliminate or modify the EIRP restriction for terrestrial operators of 14.0 dBm per 24 megahertz (–16.0 dBW per 24 megahertz)?

21. *Protecting DBS Operations.* The MVDDS 5G Coalition and others assert that coexistence is feasible between those conducting two-way mobile operations and existing and future DBS receivers. They maintain that terrestrial operators could apply existing technology profiles and newly available ultra-high resolution imagery, neither of which was available in

⁴⁶ Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat 251, 268-69 sec. 3005 Flexible Use of Electromagnetic Spectrum (codified at 47 U.S.C. 303(y)). *See also* 47 CFR 2.106, 27.2, 27.3.

⁴⁷ The Commission notes the 12 GHz band has not been proposed at the International Telecommunication Union (ITU) for 5G or International Mobile Telecommunications (IMT) use at this time. Intelsat Opposition at 3; MVDDS 5G Coalition Reply at 6; Letter From Grover G. Norquist, President, Americans for Tax Reform, *et al.*, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 3 (filed Oct. 16, 2020) (ATR Oct. 16, 2020 *Ex Parte*); Letter from Thomas A. Schatz, President, Citizens Against Government Waste, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, at 3 (filed Oct. 22, 2020) (CAGW Oct. 22, 2020 *Ex Parte*). The Commission seeks comment on the pertinence of this observation.

⁴⁸ *See* Letter from David Goldman, Director of Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC, Docket No. RM-11768, Attach. A, Questions Necessary to Balance the 12 GHz NPRM, at 3-4 (filed Jan. 6, 2021) (SpaceX Jan. 6, 2021 *Ex Parte*).

2002, with modest adjustments to terrestrial site locations and radio frequency design parameters. The Commission seeks comment on whether, and to what extent, the MVDDS 5G Coalition's proposed licensing of two-way, mobile operations in the band, and its proposed elimination of the EIRP limit, would substantially redefine the scope of DBS operators' obligations and potential burdens under the current regime. If flexible use is authorized in the band, should the burden of avoiding or correcting for interference to existing or future DBS subscribers be revised? Or should two-way and/or mobile licensees be subject to the same requirements for protecting DBS subscribers that currently apply to other services in the band? How could other factors—such as geographic separation, transmitter power constraints on terrestrial operations, and other siting parameters for flexible-use base stations—minimize the risk of interference to DBS users?

22. The MVDDS 5G Coalition asserts that sharing between two-way, higher EIRP mobile operations and DBS, is possible through careful selection of areas to deploy mobile broadband, modest adjustments to radiofrequency design parameters, elimination of interference through geographic separation, absorption in the clutter, transmitter power constraints on terrestrial operations, and other mechanisms. The Commission seeks comment on whether such an approach is feasible, both as a technical and a practical manner. The Commission seeks comment on the costs and benefits of such an approach.

23. The MVDDS 5G Coalition also suggests that keeping terrestrial signals below the applicable EPFD limit at all DBS antenna locations generally could avoid harmful interference to existing DBS subscribers regardless of the EIRP or whether the operations are fixed or mobile, or one- or two-way.⁴⁹ Do commenters agree? AT&T notes that DBS customers can install

⁴⁹ See MVDDS 5G Coalition Petition at 19; MVDDS 5G Coalition Comments at 6 & n.21 (citing Coexistence 1 at 4). AT&T had argued that there may be potential statutory issues including whether proposed two-way, mobile use of the band would require an independent technical analysis showing that DBS would be protected. AT&T Opposition at 2 & n.4 (citing section 1012 of the LOCAL TV Act). In December 2018, however, this provision the LOCAL TV Act was stricken. Pub. L. 106-553, 114 Stat. 2762, 265-66 sec. 1012 Prevention of Interference to Direct Broadcast Satellite Services, *stricken by* Pub. L. 115-334, 132 Stat. 4490, 4777-78 sec. 6603 Amendments to Local TV Act.

dishes anywhere on their premises and sometimes even on moving vehicles, and that DBS operators do not have access to granular location data for their receive terminal installations. Does the Coalition's proposed solution resolve that concern? Can cell-site EIRP or location be engineered to mitigate any potential interference? What are appropriate EIRP considerations for base and mobile stations? Given that all DBS earth stations look toward the southern sky for communication with GSO space stations orbiting at the equatorial plane, and given that high-gain antennas are necessary for base stations, can base station location and/or antenna orientation be situated to provide greater protection to DBS earth stations? What is the impact of base station height with respect to interference? Will lower base station height reduce the potential for interference to both DBS and NGSO? What are the potential costs associated with this solution?

24. AT&T counters that although one-way services currently permitted under MVDDS licenses may coexist with DBS, two-way mobile service would create an untenable interference environment for DBS subscribers. Specifically, AT&T contends that enabling two-way, mobile use—which would include transient signals from unpredictable locations and angles—would make it impossible to model and avoid interference to DBS receivers, and that it would be “exceptionally difficult for the DBS operator to trace or identify” the cause of interference as the signal moved. The Commission seeks comment on this view.

25. *Protecting NGSO FSS Operations.* SpaceX asserts the technical studies submitted by the MVDDS 5G Coalition demonstrate that “while coexistence between DBS and 5G MVDDS would prove feasible within limits, coexistence between NGSO FSS and 5G MVDDS would not prove feasible, without substantial constraints on one or both services,” and that “MVDDS licensees cannot deploy two way 5G services in the 12.2-12.7 GHz band without overwhelming NGSO FSS operations, even under the current rules, notwithstanding new 5G deployment architectures and newly available high-resolution ground-obstacle data.” SpaceX also points out that one such 2016 study assumes “an overly optimistic 30dB of NGSO user

antenna discrimination toward the horizon and still determines that extreme interference ($C/I = 0\text{dB}$) into the NGSO receiver will occur from a single 5G mobile device that is 1,000 meters away operating at EIRP of 23dBm per 24MHz in free space conditions.” SpaceX argues that “[e]xtending this analysis to a more relevant threshold of I/N of -6 to -12dB yields the conclusion that a single 5G mobile device could cause interference at a distance of greater than 10km in free space conditions,” and that “[m]ore than one 5G mobile device in the vicinity would increase this distance.” Accordingly, SpaceX asks how DISH would ensure that its 5G mobile users are always tens of kilometers from the nearest NGSO user antenna on the ground, or approximately 10 kilometers away for single 5G mobile devices, with larger separation distances necessary for multiple 5G devices? Furthermore, it asks if such separation distances are really a practical solution as NGSO FSS users become ubiquitously deployed in the near future? Finally, it inquires if under this scheme, 5G operations in an area would cease operations if notified by an NGSO operator of observed interference?

26. DISH asserts that technological developments in the satellite industry may have increased the degree to which NGSO FSS constellations and flexible use, including two-way mobile service, may coexist. Specifically, DISH maintains that current-generation NGSO FSS constellations possess geostationary-like functions and properties that could prove more compatible with flexible use than last-generation NGSO earth stations. DISH asserts that to the extent NGSO FSS satellites maintain a highly elliptical orbit and time their active operations to align with the perigee of their orbit in a manner intended to simulate the operation of a GSO system,⁵⁰ such operations presumably would be in a better position to coexist with flexible use operations than a standard NGSO FSS system. DISH further contends that, given the large number of satellites contemplated by these systems, an NGSO FSS antenna should be expected to operate with a much narrower field of view as opposed to one encompassing all realistic

⁵⁰ A highly elliptical orbit is a highly eccentric orbit with a low perigee and a high apogee. Perigee is the point in a satellite’s orbit closest to the earth, while apogee is the point in orbit farthest from the earth. The orbital pattern follows the curve on an ellipse.

azimuths and elevation angles. Thus, DISH asserts that, at some level of concentration, large numbers of NGSO FSS satellites could operate for interference purposes like fixed DBS licensees, because the receiving earth stations would be directed at a limited number of proximate points in low-Earth orbit instead of at a nearly limitless array of different points throughout the sky.

27. The Commission seeks comment on the technical analyses submitted to date, as well as further information and studies related to the feasibility, costs, and benefits of sharing among these services. To what extent does NGSO satellite systems operate in a manner described by DISH? In other words, do all NGSO systems operate in highly elliptical orbits or with earth stations pointed toward fixed locations in the sky? If not, are there plans for NGSO system operators to modify their systems in this manner? What would be the implication on latency for end users if NGSO FSS systems were modified to highly elliptical orbits? What is the practical range of azimuth and elevation angles over which NGSO earth stations are expected to operate? SpaceX notes that existing NGSO FSS systems are authorized to operate down to 10-degree elevation angles in the U.S. and questions whether terrestrial uses could be added to the band while still protecting NGSO licensees that use these elevation angles. What level of NGSO FSS satellite concentration would ensure that NGSO receiving earth stations would be directed at a limited number of proximate points in low-Earth orbit? How many earth stations do NGSO operators expect to deploy? What methods can base and mobile stations use to avoid causing harmful interference to NGSO receive stations? Commenters that contend that coexistence is feasible should address whether, given the existing technical rules, sufficient spectrum will be available to support new terrestrial service and describe the potential costs associated with any solution.

28. The Commission notes that NGSO interests and various other parties argue that expanding terrestrial rights to include flexible use, including two-way, mobile service in the 12 GHz band, could create harmful interference that would jeopardize their offerings, and

undermine the investments that they have made in the band. The Commission seeks comment on the appropriate technical criteria that would be necessary to protect NGSO FSS from harmful interference from higher-power, two-way mobile operations. Would the existing interference criteria in the MVDDS rules be sufficient?⁵¹ How would an NGSO FSS operator or subscriber identify the source of any interference received in the event that mobile operations are authorized in the band? SpaceX argues that, because the Commission has permitted blanket authorizations for earth stations in the band (enabling millions of consumer earth stations to ubiquitously proliferate), it would be impossible to track these consumer deployments in real-time, much less prevent harmful interference to them by transient and unpredictable mobile operations. SpaceX also points out that the sharing studies submitted by the MVDDS Coalition confirm that 5G use would clearly overwhelm NGSO FSS operations. Given the potential for NGSO FSS operations to provide much needed service in rural and other underserved areas, The Commission seeks comment on the costs and benefits of adding terrestrial two-way mobile services to the band.

29. In response to the assertions from SpaceX and other NGSO operators about the potential for harmful interference, DISH argues that NGSO FSS service is not dependent on the 12 GHz band; it contends that, “[i]f the FCC were to repurpose the 12 GHz band for terrestrial 5G services, SpaceX would retain nearly 97% of all spectrum and nearly 94% of all space-to-earth spectrum made available for its proposed NGSO FSS system.” In response, several NGSO operators argue that the entirety of the two gigahertz of spectrum from 10.7 GHz to 12.7 GHz currently licensed to several NGSO FSS operators for downlink operations is necessary for NGSO FSS deployment. SpaceX argues there are additional constraints in the other portions of 10.95–12.2; for example, 10.95–11.7 has further non-harmful interference protections due to terrestrial being primary, which could affect consumer earth stations in this portion of the band.

⁵¹ See 47 CFR 101.113(a) n.11, (f)(1); 101.147(p). See also 47 CFR 101.105(a)(4)(i) (limiting the PFD level beyond 3 km from an MVDDS station to -135 dBW/m² in any 4 kHz measured and/or calculated at the surface of the earth), 101.129(b) (prohibiting location of MVDDS transmitting antennas within 10 km of any qualifying NGSO FSS receiver absent mutual agreement of the licensees).

Others argue that harmful interference to NGSO operators in the 500 megahertz of the 12 GHz band would negatively affect NGSO operators' ability to split equally the remaining 1.5 gigahertz of spectrum during in-line interference events. The Commission seeks comment on these views, but reiterate that it is focused on protecting incumbent licensees, including incumbent NGSO operators, from harmful interference in this proceeding.

30. *Other Technical Means of Protecting Satellite Incumbents.* One additional approach to protecting incumbents would be to restrict new terrestrial operations to indoor use. The Commission has adopted this approach to permit unlicensed devices to share spectrum with licensed services in several bands.⁵² Such indoor devices could be used for providing Internet connectivity as well as connecting Internet-of-things devices in both consumer and industrial applications. The Commission's Technological Advisory Council 5G/IoT/O-RAN working group recommended that the Commission consider private spectrum for enterprise Internet-of-things devices in locations such as confined geographic areas, buildings, and campuses. Could indoor 12 GHz unlicensed devices meet this need? Would restricting new terrestrial devices to indoor uses enable them to co-exist with satellite services? What power level would the indoor devices need to be limited to avoid causing harmful interference to satellite services (and would it be materially higher than if the Commission assumes outdoor use for the new terrestrial operations)? What would be the costs and benefits of this approach?

2. Assigning New Terrestrial Use Rights

31. The Commission next seeks comment on how it should assign any new terrestrial service rights. Given that MVDDS licensees themselves have terrestrial usage rights in large geographic areas across the United States, the Commission seeks comment on three approaches to authorize any new terrestrial rights in the band: (1) modifying the licenses of existing

⁵² 47 CFR 15.407 (d)(3); *Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3852, 3888-89, paras. 98-103(2020); *Use of the 5.850-5.925 GHz Band*, First Report and Order, Further Notice of Proposed Rulemaking, and Order of Proposed Modification, ET Docket No. 19-138, FCC 20-164, para. 61 (adopted Nov. 18, 2020).

licensees under section 316 of the Communications Act, (2) auctioning off overlay licenses in the band, and (3) authorizing underlay use of the band.

32. *First*, should the Commission consider modifying existing incumbent licenses using its section 316 authority to allow increased terrestrial operational flexibility? In this band, because there are several types of existing incumbents—DBS, MVDDS, and NGSO—there are several potential options for expanding terrestrial rights. One option would be to expand the rights of existing terrestrial licensees to allow them to provide 5G terrestrial services. For instance, when the Commission authorized mobile use in the 28 GHz band, it granted mobile rights to existing fixed licensees, after finding that such an approach would expedite service, and that separating “fixed” and “mobile” rights into different bundles could create unnecessary complexity and potential for interference. Similarly, the Commission has modified other licenses in the past to increase the flexibility afforded to incumbents to put spectrum to its highest and best use.⁵³ Do similar reasons support modifying the MVDDS licenses to incorporate greater flexibility? Or are there distinctions that suggest the Commission should adopt a different approach here?

33. Another option would be to grant flexible terrestrial use rights to the incumbent satellite operators. As SpaceX notes, the Commission granted terrestrial rights to the AWS-4 band to existing satellite licensees based on an assumption that closely coordinated satellite and terrestrial operations would be necessary to overcome interference issues. Would affording flexible use rights to incumbent satellite operators best ensure that these services do not experience harmful interference?

34. Under the current regulatory regime in the band, DBS operators have priority over

⁵³ See, e.g., *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands* (2 GHz bands), WT Docket Nos. 12-70 and 04-356, ET Docket No. 10-142, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16220-22, 16224, paras. 319-21, 331-32, (2012) (modifying incumbent MSS licensees to allow widespread terrestrial authorizations); *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*, WT Docket No. 07-293, Report and Order and Second Report and Order, 25 FCC Rcd 11710, 11712, 11723, paras. 2, 29 (2010) (modifying rules to enable the deployment of mobile broadband services by incumbent terrestrial licensees).

the other services, including both MVDDS and NGSO licensees. Should the Commission grant flexible terrestrial use rights to DBS licensees based on their priority status? One of the potential challenges to such an approach, however, involves the different ways in which DBS rights and terrestrial rights are generally assigned. While the DBS operators have exclusive rights to transmit from each of their orbital slots, they have non-exclusive rights in terms of geographic coverage (i.e., they jointly share the right to transmit across the United States using the 12.2-12.7 GHz band). In contrast, in order to encourage investment and innovation by terrestrial licensees, the Commission generally assigns new terrestrial use licenses on an exclusive geographic basis. Given that each DBS operator in the band uses the full 12 GHz band on a shared basis with the other DBS operator, if the Commission awarded flexible terrestrial use rights to both incumbents, how should the flexible terrestrial use rights be awarded? Could the Commission leave this matter to commercial negotiations between the parties? If so, would such an approach lead to an efficient outcome? If the Commission cannot rely solely on negotiation between the DBS operators, how would it reconcile conflicts between the DBS operators over how to apportion terrestrial rights? The Commission notes that, under section 309(j) of the Communications Act of 1934, as amended, if mutually exclusive applications for initial licenses are received, it must use competitive bidding to resolve the mutual exclusivity. The Commission seeks comment on whether, and how, the process of negotiating and assigning terrestrial rights to DBS operators could occur without triggering this requirement.

35. Alternatively, the Commission could grant flexible terrestrial use rights to NGSO operators in addition to DBS operators. The Commission notes that this option would create at least two complications. First, there would need to be negotiations between a significantly larger number of operators—there are currently only two DBS operators, while there have been six NGSO authorizations granted for use of the 12 GHz band. Second, the apportionment of terrestrial rights would be further complicated by the fact that one set of operators (DBS) currently has superior rights to the other set of operators (NGSO). Could the Commission rely

on commercial negotiations to achieve an efficient outcome between these operators, and if not, would it be possible to resolve differences in a manner that both comports with section 309(j) and achieves an efficient and expeditious outcome?

36. *Second*, should the Commission auction overlay licenses for the band? Some commenters argue that this approach would ensure that the new flexible-use licenses are assigned to entities that are capable of rapidly deploying in the band. If the Commission was to adopt this overlay license approach, it expects that new licensees would not be able to deploy operations that would cause harmful interference to incumbent operations absent an agreement to the contrary. What rights, if any, should overlay licensees have to relocate incumbent operations? Specifically, should the Commission authorize only voluntary relocation of incumbent operations, either for a limited period or in perpetuity?⁵⁴ Or should the Commission allow mandatory relocation of such operations, either immediately or after some period of time to allow negotiations? If the Commission was to authorize mandatory relocation, should the new licensees be responsible for finding or consolidating incumbent operations (while ensuring such operators can continue with substantially similar operations and are held harmless financially)? Or should the Commission designate some portion of the 12 GHz band or another spectrum band for such relocation? What parameters would the Commission need to put down to ensure efficient use of new overlay licenses while protecting incumbents? Would a transition mechanism like the one used in 3.7-4.2 GHz, including accelerated relocation payments for incumbents to encourage them to voluntarily make the spectrum available for two-way mobile flexible use in an expeditious manner, be appropriate for some or all incumbents in this band?⁵⁵

37. *Third*, should new terrestrial operations come in the form of an underlay? Under

⁵⁴ In the 900 MHz Report and Order, the Commission realigned the band and established a transition mechanism based primarily on negotiations between prospective broadband licensees and existing narrowband incumbent licensees. *Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, Report and Order, Order of Proposed Modification, and Orders, WT Docket No. 17-200, FCC 20-67, (May 14, 2020).

⁵⁵ See 47 CFR 27.1411-27.1424, *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343 (2020). See also AT&T Aug. 6, 2020 Ex Parte at 6.

this type of approach, any additional terrestrial operations likely would need to be authorized at low power and would need to operate on an opportunistic basis, not causing harmful interference to—nor seeking protection from harmful interference by—the incumbent primary services in the band. For example, if the technical analysis were to show only that low-power, two-way operations were feasible, would a low-power, unlicensed underlay make the most sense, as advocated by Public Knowledge? Specifically, Public Knowledge argues that making 500 megahertz of spectrum available on an unlicensed or licensed-by-rule basis could allow for new Wi-Fi 6 uses which the Commission has previously supported in the 6 GHz proceeding. If the Commission adopts such an approach, could it rely on its traditional part 15 rules for such an underlay? Alternatively, should the Commission consider the auctioning of underlay licenses or licensing underlay use by rule? The Commission notes that any users of such an underlay would be required to fully protect all DBS, NGSO FSS, and MVDDS operations. Given this requirement, the Commission seeks comment on the costs and benefits of an underlay approach.

38. In deciding how to assign new terrestrial rights, the Commission notes that several commenters contend that MVDDS licensees have failed to provide meaningful commercial service in the band. As a construction requirement, MVDDS licensees must make a showing of substantial service at the end of five years into the license period and ten years into the license period.⁵⁶ The Commission established a safe harbor for MVDDS of actual delivery of service to customers via four separate transmitting locations per million population in their license area.⁵⁷ The Commission is aware of only one current wide-area commercial MVDDS

⁵⁶ 47 CFR 101.1413(b) (“The substantial service requirement is defined as a service that is sound, favorable, and substantially above a level of mediocre service which might minimally warrant renewal.”). At the end of each period, “the Commission will consider factors such as: (1) whether the licensee’s operations service niche markets or focus on serving populations outside of areas serviced by other MVDDS licensees; (2) whether the licensee’s operations serve populations with limited access to telecommunications services; and (3) a demonstration of service to a significant portion of the population or land area of the licensed area.” *Id.*

⁵⁷ See *Amendment of Parts 2 and 25 of the Commission’s Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, Memorandum Opinion and Order and Second Report and Order, ET Docket No. 98-206, 17 FCC Rcd 9612, para. 177 (2002).

deployment, in Albuquerque, New Mexico.⁵⁸ Apart from the showing for the Albuquerque license, other licensees report meeting the Commission's substantial service construction requirement for each license based on the safe harbor for MVDDS. Although MVDDS licensees point out that they met the required construction benchmarks and claim that they have plans for future service, these licensees also contend that the current technical rules for MVDDS are prohibitively restrictive. Should the Commission delay expanding flexible-use rights in the 12 GHz band until such time as the Bureau resolves any issues associated with MVDDS licensee's substantial showing filings, as suggested by SpaceX? While the Commission expects that the Bureau will carefully examine the licensees' filings for compliance with the applicable rules, it also seeks comment on the current status of MVDDS network construction. In what areas are MVDDS licensees currently providing services and in what areas do licensees anticipate offering services in the near term?

3. Approaches to Sharing

39. If coexistence among the co-primary services, i.e., DBS, NGSO FSS, MVDDS incumbents, and the proposed flexible-use service (i.e., two-way, mobile service) is technically feasible without resulting in harmful interference to any incumbent service, the Commission next seeks comment on the appropriate means to facilitate such shared use. The Commission recognizes that its technical analysis as well as public interest considerations will guide its approach to sharing, and it seeks comment on whether particular approaches to sharing depend on certain results of its technical analysis (for example, is one approach more appropriate than another if it kept a maximum EIRP for terrestrial operations?).

40. *Service-Rule Sharing.* The Commission first seeks comment on whether the

⁵⁸ The MVDDS licensee in Albuquerque, New Mexico, reports that it has deployed a large-scale broadband Internet service offering that reaches more than 900,000 people (or approximately 50 percent of the population) in the Albuquerque geographic license area. *See* RS Access, LLC, ULS File No. 0008742312, Required Notification for Call Sign WQAR 561, Substantial Service Showing Supplement at 43-49. "To build a high-speed, high-power broadband network, RSA/MDS required a waiver from the FCC of certain MVDDS operating constraints – namely, the EIRP levels." *Id.* at 43 (note omitted). RS Access states that the waiver allows a single transmitter to replicate the service quality of multiple MVDDS transmitters operating elsewhere without a waiver. *Id.* at 43.

operating parameters proposed by the MVDDS 5G Coalition—specifically modifying the power levels available to terrestrial operations and modifying some of the coordination requirements—are sufficient to enable new terrestrial operations. What are the maximum power levels and the most flexibility that could be granted to new terrestrial operations with simple service-rule sharing while still protecting incumbents from harmful interference? Commenters should discuss the potential benefits and value of terrestrial operations under these conditions.

41. *Geographic Sharing.* Would geographic sharing protect and facilitate use of DBS and NGSO FSS in some areas without precluding new flexible-use deployment elsewhere? Would geographic sharing allow higher-power terrestrial operations in certain areas rather than others? How should such geographic sharing be structured? Do subscribers of satellite services typically receive these services in more rural areas? What are the propagation characteristics of this band with respect to mobile system coverage? What is the cell size? Like other, higher-frequency 5G bands, will cell size be limited to a few hundred meters based on line-of-site conditions? Can smaller sized cells provide the flexibility necessary to mitigate any potential interference with respect to DBS (or NGSO) satellite service operations either before or after deployment of the network? What are the potential costs and benefits of geographic sharing?

42. According to AT&T, the MVDDS 5G Coalition’s proposal would result in “some fixed, low-power base stations in ‘unique geographic conditions’ away from the millions of DBS users sprinkled through virtually every community, perhaps in ‘urban canyons’ or other places where satellites might not reach.” The Commission seeks comment on this view.

43. *Dynamic Sharing Between Full Power Terrestrial and Satellite.* Federated Wireless claims that “industry [has] confidence in the ability of dynamic spectrum sharing technologies to enable new and innovative uses in [] spectrum, while protecting incumbent operations.” Parties such as DISH, DSA, Federated Wireless, Public Knowledge, RS Access, and WeLink argue that new dynamic spectrum sharing techniques, such as spectrum access systems (SASs) that were developed for the Citizens Broadband Radio Service and the

automated frequency coordination (AFC) approach established for unlicensed access in the 6 GHz band, could facilitate increased terrestrial use of the 12 GHz band. How could dynamic sharing mechanisms facilitate continued use by DBS, NGSO FSS, and MVDDS incumbents, while also accommodating potential new uses such as two-way mobile service?

44. What improvements have there been in dynamic spectrum technology that might enable flexible use and sharing among these services? For example, are database-based coordination systems sophisticated enough to account for earth stations' receiving data from both thousands of NGSO satellites as well as DBS receivers, thus permitting mobile terrestrial use while preventing harmful interference to all incumbent users? How would such a system work? Is there any history of successful dynamic spectrum sharing involving widely deployed satellites and ubiquitous terrestrial services?

45. How long would it take to develop an automated frequency coordination mechanism for the services in this band? To what extent could the Commission leverage existing technologies (either the SASs created for the 3.5 GHz band or the AFC being developed for the 6 GHz band) to perform these functions? Would an entirely new system need to be developed? To the extent the Commission could repurpose an existing system, what benefits or trade-offs would there be between using an existing system versus creating an entirely new dynamic-use system specifically tailored to the 12 GHz band? Would such a spectrum sharing system be able to satisfy the spectrum access needs for all the current and potential future satellite and terrestrial operators? If so, would it be worth the cost and burden of such a system to the respective services?

46. If the Commission choose a dynamic sharing approach, it would propose to follow the existing prioritization of services for protection, with DBS continuing to receive the highest protection, followed by NGSO FSS and MVDDS. How should the Commission assign priority under this approach to new terrestrial operations? And should the Commission assign priority between NGSO FSS and MVDDS uses? Should the Commission continue to apply a

“first-in-time” approach in the context of a more dynamic sharing environment?

47. The Commission seeks comment on how a dynamic sharing mechanism would incorporate legacy DBS consumer equipment? AT&T has expressed concern that DBS is unlike a fixed service because DBS receivers are deployed ubiquitously, with some installed on vehicles and thus effectively mobile, and because exact geographic coordinates are not known.⁵⁹ Could these conditions be remedied and could the Commission seek information to obtain greater granularity of location, information on DBS end-user equipment, the height of such equipment at the installation location and any technical aspects relevant for coordination? How would a dynamic frequency sharing coordination mechanism determine the presence and potential for interference from terrestrial services to DBS? How would such a mechanism incorporate legacy NGSO FSS consumer terminals? If current DBS or NGSO FSS end-user equipment or databases are not able to support some type of coordination mechanism, should the Commission adopt a requirement to incorporate such equipment going forward? Should legacy equipment be grandfathered and allowed to operate until a specified end date? The Commission notes that to receive protection from new proposed MVDDS transmitters, NGSO FSS licensees must already maintain a database of fixed subscriber earth stations, in a format that can be readily shared with MVDDS licensees.⁶⁰ Would such a database similarly facilitate protection from new terrestrial mobile two-way services? How should the Commission address any consumer privacy concerns, or protection of proprietary and confidential business information, that might arise from the use

⁵⁹ AT&T Oct. 16, 2020 *Ex Parte* at 2. According to AT&T, DBS receivers are tied to subscriber addresses, not specific coordinates, and subscribers have the right to move their dish from one location to another on their property without no notification requirement. *Id.*

⁶⁰ See, e.g., 47 CFR 25.139(a) (requiring NGSO FSS licensees to maintain a subscriber database in a format that can be readily shared with MVDDS licensees for the purpose of determining compliance with the MVDDS transmitting antenna spacing requirement relating to qualifying existing NGSO FSS subscriber receivers set forth in § 101.129); 101.103(f)(1) (prior to the construction or addition of an MVDDS transmitting antenna, the MVDDS licensee shall provide notice of intent to construct the proposed antenna site to NGSO FSS licensees operating in the 12 GHz band and maintain an Internet web site of all existing transmitting sites and transmitting antennas that are scheduled for operation within one year, including the “in-service” dates); 101.129(b) (MVDDS licensees must not locate transmitting antennas within 10 km of any qualifying NGSO FSS receiver); 101.1440(b) (for each proposed transmitter, MVDDS licensees must conduct a survey to determine the location of all DBS customers of record that may potentially be affected by the introduction of its MVDDS service).

of one or more databases to facilitate shared use among competing services?⁶¹

48. If the Commission decides to give priority to new terrestrial flexible-use services, vis-à-vis NGSO FSS or MVDDS, should it consider an approach similar to that taken in the 3.5 GHz band, in which it auctioned Priority Access Licenses (PALs) to promote innovative use while protecting incumbents? Federated Wireless argues that the auction of PALs in 3.5 GHz band could serve as a model for how to facilitate shared use in the 12 GHz band. SpaceX, however, argues that there are important distinctions between the 3.5 GHz band and the 12 GHz band that make it infeasible to auction PALs in this band. For example, SpaceX asserts that there are far fewer earth stations in the 3.5 GHz band than the 12 GHz band because FSS use in the former is limited to international inter-continental systems and is subject to case-by-case electromagnetic compatibility analysis. In addition, according to SpaceX, blanket earth station licensing in 12 GHz means that there are many more receivers in the band that cannot be adequately tracked (including DBS receivers). The Commission seeks comment on these views.

49. More broadly, how would dynamic spectrum sharing affect existing services? Would it reduce the incentives of existing operators to invest in deployment? During the period in which a sharing technology was developed, would it prevent the band from being put to its most productive use? Or would it facilitate new investment and innovation in this band?

50. *Opportunistic Use of the Band.* Are there other approaches the Commission could adopt to enable operation of opportunistic use of the 12 GHz band? What technical and operational rules would be needed to ensure such systems do not cause harmful interference to incumbent systems? Considering the spectral needs of DBS, MVDDS, NGSO FSS, would there be usable spectrum in enough geographic areas to allow for more than *de minimis* opportunistic use? Would there be enough interest in such use to spur equipment manufacturing? Commenters that believe there is a potential approach should specifically address the potential

⁶¹ SpaceX Jan. 6, 2021 *Ex Parte*, Attach. A at 2-3.

value created through sharing and costs of the proposed solution.

51. DSA argues that the Commission could promote far more intensive use of the band by authorizing coordinated access to vacant 12 GHz spectrum on a secondary basis. It contends that such an approach would “provide spectrum-as-infrastructure to fixed wireless ISPs and other broadband network providers [that operate] in underserved” areas, including rural and tribal communities. DSA argues that the Commission could adopt rules for opportunistic access to locally vacant spectrum in the 12 GHz band that operate in much the same way as the 3.5 GHz band rules authorize General Authorized Access (GAA) to unused PAL spectrum. Should coordinated, shared use of the band for high-capacity fixed wireless services be authorized on an opportunistic, unlicensed, or licensed-by-rule basis?

52. Could the 12 GHz band support opportunistic use of unused spectrum on a localized basis, such as for high-capacity fixed wireless in rural and less densely populated areas? What technical and operational rules would be needed for such usage to ensure that incumbent services are protected from harmful interference? Would the benefits of opportunistic use outweigh the costs, such as the complexity it would create and the coordination burden it would place on incumbents?

53. Could such operation be permitted based on sensing technology or a database (such as a SAS)? What provisions would be needed under either type of regime to prevent harmful interference to other services?

B. Maintaining the Current Framework

54. Next, the Commission seeks comment on whether the costs of accommodating new services in the band, including the potential for adverse impact or additional burden on existing services, exceed the benefits. Several commenters argue that the existing rules and services in the band allow for intense and efficient use of this spectrum, and that changes to the band are therefore unnecessary. For example, SpaceX’s Starlink system has commenced testing of its service in multiple states, and SpaceX asserts it will begin commercial broadband service

to rural users by the end of 2020. SpaceX cites support from several organizations for its Starlink system, such as the Hoh Indian Tribe in Washington who has stated that “because of NGSO service, the tribe ‘finally has broadband, distributed to its community in only a matter of weeks’ and that the Commission should ‘maintain the careful and successful balance that allows the 12 GHz frequency band to provide this service.’” SpaceX was a winning bidder in the Rural Digital Opportunity Fund Phase I auction, where it won \$888.5 million to deploy high-speed broadband to unserved homes and businesses over a ten-year period. SpaceX claims that its service is capable of providing downlink/uplink speeds of 103/42 megabits-per-second and a consistently observed median latency of 30 milliseconds. According to SpaceX, making changes to the band potentially could threaten its planned operations while doing little to close the digital divide. How might this uncertainty affect future investment in new systems, whether in 12 GHz or in other frequency bands? What actions can the Commission take in this proceeding to ensure that the locations successfully bid for through the RDOF process get access to the broadband Internet access service committed to through that program? SpaceX further claims that NGSO systems have the potential to provide low latency 5G backhaul using 12 GHz band spectrum. Could maintaining the current framework allow NGSO-provided backhaul to proliferate? Alternatively, would allowing terrestrial mobile service in the band harm NGSOs’ ability to provide backhaul? If terrestrial mobile and satellite-based backhaul services cannot both be provided in the band, then which service would best serve the public interest?

55. AT&T has repeatedly argued that adopting the proposals of the MVDDS 5G Coalition would not adequately protect DBS operations in the 12 GHz band, which potentially could result in “an untenable interference environment” for the tens of millions of DBS subscribers receiving programming via the 12 GHz Band. DISH, which is the other DBS provider in the band, disagrees and contends that MVDDS 5G Coalition’s two technical studies have demonstrated that geographic separation, transmitter power constraints on MVDDS operations, and other siting parameters, as well as absorption due to clutter, can ensure that

interference from terrestrial base stations to DBS users would rarely, if ever, occur. If the Commission maintains the current framework, then NGSO FSS and Fixed Service would continue to operate on a co-primary, non-harmful interference basis to DBS.⁶² In that case, neither DBS nor NGSO FSS would be subjected to the uncertainty of new rules adopted for the band. Are the potential benefits of further action to facilitate flexible use for terrestrial services in the 12 GHz band outweighed by the potential uncertainty and the costs caused by granting terrestrial, flexible-use rights in this band? Should the Commission conclude that the appropriate balance between satellite and terrestrial use has already been struck by the framework currently in place, such that few or no revisions to the service rules are required?

56. As noted above, the Commission has made a substantial amount of spectrum available for 5G services in the period since the 5G MVDDS Coalition filed its Petition. In particular, since that time, the Commission completed the post-auction transition of the 600 MHz band, making 70 megahertz of low-band spectrum available for 5G. The Commission completed three auctions of millimeter-wave spectrum, putting nearly five gigahertz of high-band spectrum into the market. At least one nationwide service provider has characterized this spectrum as instrumental to its 5G deployment plans. As for mid-band spectrum, the Commission has repurposed 480 megahertz between 3550 and 3980 MHz and is on track to potentially repurpose an additional adjacent 100 megahertz in the 3.45 GHz band.⁶³ Have intervening developments over the past four years, including the Commission's work to make additional spectrum resources available for 5G and the number of NGSO systems that have been authorized to operate using 12 GHz band spectrum, counsel against making changes to the current framework

⁶² Under the approach that the Commission adopted for NGSO FSS and MVDDS sharing, first in-time NGSO FSS receivers and first in-time MVDDS transmitting systems are afforded more and easier use of the shared 12 GHz band than subsequent deployments. The Commission concluded that such a result is equitable and consistent with the co-primary status of NGSO FSS and MVDDS. *See MVDDS Second Report & Order*, 17 FCC Rcd at 9659, para. 111; *see also OneWeb Order*, 32 FCC Rcd at 5370 para. 8.

⁶³ *Auction of Priority Access Licenses in the 3550-3650 MHz Band Closes; Winning Bidders Announced for Auction 105*, Public Notice, 35 FCC Rcd 9287 (2020); *Expanding Flexible Use in the 3.7-4.2 GHz Band*, Report and Order, Order Proposing Modification, 35 FCC Rcd 2343 (2020), *Facilitating Shared Use in the 3100-3550 MHz Band*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 11078 (2020).

for the 12 GHz band? The Commission values the public interest benefits that could flow from NGSOs offering an affordable solution for delivering high-speed Internet services to communities that might be more expensive to serve through other technologies. How should the potential public interest benefits of those services be balanced by the Commission as it proceeds with this rulemaking?

57. The Commission noted in the *OneWeb Order*, 32 FCC Rcd 5366 (2017), that NGSO FSS operators have access to other frequency bands, “such that even if NGSO FSS systems were precluded entirely from the 12.2-12.7 GHz band,” OneWeb would still retain a measure of flexibility to provide its proposed services. Given the proliferation of NGSO authorizations and ongoing deployments, the Commission seeks comment on whether this remains the case, as well as the costs and benefits of maintaining the current framework. Additionally, the Commission adopted similar, though not identical, conditions in the various NGSO authorizations for use of the 12 GHz band. The Commission seeks comment on the various conditions included in the NGSO authorizations and what effect (if any) these variations should have on its analysis.

58. If the Commission maintains the current framework, should it make any revisions to the MVDDS technical rules within the existing regulatory framework so as to facilitate more robust terrestrial operations without causing harmful interference to satellite operations in the band?⁶⁴ The Commission notes that it contemplated that MVDDS service providers might petition for waivers of the technical rules and that, in denying a petition for reconsideration to increase the power limit for all MVDDS licenses, it was not prejudging whether a rationale for higher EIRP and EPFD limits in rural areas might have some technical merit in certain very specific circumstances. The Commission also stated that after it gained experience with MVDDS operations, it would entertain requests to modify the general EPFD and EIRP limits, if

⁶⁴ See, e.g., *Wireless Telecommunications Bureau Seeks Comment on Petitions of Seven Licensees for Waiver of Multichannel Video Distribution and Data Service Technical Rules*, WT Docket No. 15-218, Public Notice, 30 FCC Rcd 9953 (WTB BD 2015) (petitioners seek waivers of 47 CFR 101.113 note 11, 101.147(p), 101.1407, and 101.1411(a), to use the 12 GHz band for two-way, point-to-point operation at an EIRP up to 55 dBm).

such experience provided sufficient justification for such action. The Commission invites comment on whether there are any other changes it could adopt in revising its existing rules that would improve the efficiency of incumbent use of the band.

III. ORDERING CLAUSES

59. IT IS ORDERED, pursuant to the authority found in sections 1, 2, 3, 4, 5, 7, 301, 302, 303, 304, 307, 309, 310, and 316 of the Communications Act of 1934, 47 U.S.C. 151, 152, 153, 154, 155, 157, 301, 302, 303, 304, 307, 309, 310, and 316, and §§ 1.407 and 1.411 of the Commission's rules, 47 CFR 1.407, 1.411, the petition for rulemaking filed by the MVDDS 5G Coalition, RM-11768, IS GRANTED to the extent discussed herein and otherwise TERMINATED, and this *NPRM* in the captioned docket(s) IS ADOPTED.

60. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *NPRM*, including the IRAF, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION.

Marlene Dortch,

Secretary,

Office of the Secretary.

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